

# UTILIZATION OF SUPERVISORY TECHNOLOGY TO SUPPORT RISK CONCENTRATION ANALYSIS IN THE FINANCIAL SERVICES AUTHORITY

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## Abstract

*In carrying out its integrated regulatory and supervisory function in the financial services sector, the Financial Services Authority (OJK) receives various reports from Financial Services Institutions (LJK), Issuers, and Public Companies regarding the receipt and distribution of funds. The complexity of funding and financing relationships between financial service actors creates concentration risks that have the potential to disrupt financial system stability. Experiences from the 1998 Indonesian crisis and the 2008 global financial crisis demonstrate that concentration of exposures and interconnectedness between entities can exacerbate systemic risk. This study aims to identify current supervisory data analysis practices and propose the development of a concentration risk analysis that integrates the loan exposures of large debtor groups with their funding sources. The study used a qualitative approach through interviews, observations, and document analysis. The results indicate that OJK supervisors need an integrated concentration risk analysis across various LJKs and customer groups. Currently, the analysis process is still carried out manually, resulting in inconsistent results and difficult to replicate. The implementation of Supervisory Technology (SupTech) can improve supervisory effectiveness while transforming supervisors' tacit knowledge into explicit knowledge that is documented, standardized, and easily shared. This research contributes to the development of technology-based risk monitoring and knowledge management models in the financial services sector.*

**Keywords:** *Supervisory Technology, Suptech, Risk Concentration, Tacit Knowledge, Explicit Knowledge*

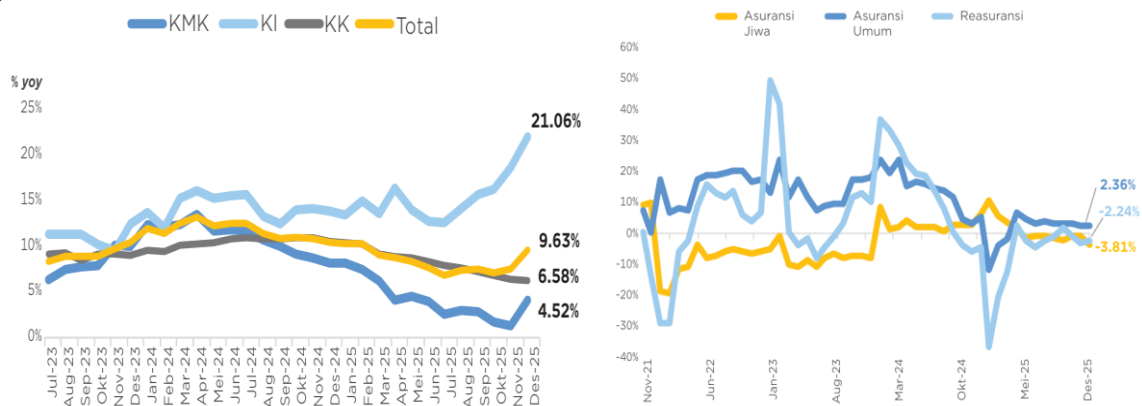
## 1. INTRODUCTION

The financial services sector plays a highly strategic role in driving economic growth through its intermediation function, namely collecting funds from those with surplus funds and channeling them to those in need of financing. The effectiveness of this intermediation function contributes to increased investment, productivity, job creation, and sustainable economic growth. As it develops, the financial services sector in Indonesia encompasses not only banking but also capital markets, insurance, pension funds, finance companies, venture capital, fintech lending, and various other financial services institutions with increasing levels of interconnectedness and complexity. This situation drives the need for a supervisory

system capable of identifying potential risks more quickly, accurately, and in an integrated manner to maintain the stability of the national financial system (World Bank, 2022).

One of the risks of primary concern in financial services sector supervision is concentration risk. This risk arises when a financial services institution's exposure is concentrated in a particular debtor, business group, economic sector, geographic region, or funding source. High levels of exposure concentration can increase the financial institution's vulnerability to economic shocks and debtor default, potentially disrupting the institution's health and even triggering systemic risk (BCBS, 2023). The experience of the 1998 Indonesian financial crisis demonstrated that connected lending practices and strong linkages between financial institutions and specific business groups can exacerbate pressures on the banking system. Similarly, the 2008 global financial crisis demonstrated that the concentration of financing in a particular sector can accelerate the spread of risk across various financial institutions and disrupt the stability of the financial system more broadly (BCBS, 2023).

The intermediation performance of the financial services industry in recent years, including in 2024 and 2025, has shown quite good growth, improving post-COVID-19 pandemic despite facing geopolitical pressures from the Russia-Ukraine war, international trade tariffs, and domestic issues. Annual (yoy) banking credit growth reached 9.63% to Rp 8,586 trillion, up from 7.70% yoy growth in September 2025, but lower than 10.46% yoy growth in December 2024.



**Figure 1.** Banking Intermediation Performance & Insurance Premium Growth  
Source: OJK (2025)

In the fourth quarter of 2025, credit growth showed strengthening, primarily supported by increased investment credit disbursement. This segment recorded growth of 21.06%, a significant increase compared to September 2025's 15.18%. Based on debtor category, corporate credit remained the largest contributor, accounting for 52.02% of total disbursed credit. Corporate credit growth also remained at double-digit levels, at 15.44%, higher than the 11.53% achieved in September 2025 and 10.78% achieved in June 2025, although slightly lower than the 15.67% achieved in December 2024. Meanwhile, financing receivables performance showed a slowing trend. In December 2025, growth was recorded at 0.61% yoy, lower than September 2025 at 1.07%, June 2025 at 1.96%, December 2024 at 6.92%, and June 2024 which reached 10.72%.

In terms of public fund collection, the banking sector continues to demonstrate solid performance, indicating a sustained upward trend. Third Party Funds (TPF) grew by 13.83% year-on-year (yoy) to Rp10,059 trillion in December 2025, compared to 11.18% in September 2025 and December 2024, respectively. This performance also represents significant improvement compared to June 2025 (6.96%), December 2024 (4.48%), and June 2024 (8.45%). Unlike banking, the insurance industry faces pressure on premium collection. Although premium collection reached Rp33.84 trillion in December 2025, the industry still experienced an annual contraction (decline) of 1.46%, lower than the positive growth of 0.38% recorded in September 2025.

The performance of the financing industry, on the other hand, shows pressure from growth in financing receivables in December 2025, which grew 2.51% year-on-year to Rp 506.5 trillion. This growth is lower than the 2.70% year-on-year growth in financing receivables in December 2024. Financing disbursed by venture capital companies grew 0.81% year-on-year in December 2025 to Rp 15.97 trillion, an improvement over the 9.47% decline in December 2024. Meanwhile, the pawnbroking industry experienced a significant increase of 32.46% year-on-year in December 2025, with total outstanding financing of Rp 130.37 trillion. Financing disbursed through the online lending industry also experienced a significant increase in December 2025, increasing by 20.29% year-on-year to Rp 96.62 trillion.

As the authority mandated to implement an integrated regulatory and supervisory system for all activities in the financial services sector, the Financial Services Authority (OJK) receives various reports from Financial Services Institutions (LJK), Issuers, and Public Companies regarding the receipt and distribution of funds. This data includes information on public fundraising, inter-financial institution loans, debt issuance, credit or financing, fund placement, and investments in various financial instruments. The sheer volume and complexity of this data essentially provide significant opportunities for comprehensive risk concentration analysis to support risk-based supervision. However, observations indicate that risk concentration analysis linking fund receipts and disbursements to specific customer groups is still conducted manually by each supervisor. This condition causes the analysis process to be time-consuming, results in inconsistent analysis quality, and is highly dependent on the experience of individual supervisors. Furthermore, the knowledge gained during the analysis process is generally stored as tacit knowledge and has not been systematically documented, making it difficult to replicate and transfer to other supervisors.

At the same time, digital transformation has driven the emergence of Supervisory Technology (SupTech), namely the use of innovative technology by supervisory authorities to improve the effectiveness, efficiency, and quality of the financial services sector's supervisory processes (Broeders et al., 2021; Bank for International Settlements, 2024). The use of technologies such as big data analytics, artificial intelligence, machine learning, and data visualization enables regulators to process large amounts of data, detect risk patterns more quickly, and support more accurate decision-making (International Monetary Fund, 2021). Various financial regulators worldwide have begun implementing SupTech to strengthen data-driven supervision and enhance early detection capabilities for potential risks that could disrupt financial system stability (Aldasoro et al., 2022).

The Financial Services Authority (OJK) has demonstrated a strong commitment to digital transformation through various initiatives to develop integrated supervisory information and data management systems. One such implementation is OJK Suptech and Integrated Data Analytics (OSIDA), designed to support supervisory processes through the use of data analytics technology. However, the current system does not specifically support risk concentration analysis, which integrates information on fund receipts, fund disbursements, and customer group connectivity at the financial services institution, financial conglomerate, or financial services sector level.

Previous research on SupTech has generally focused on reporting automation, compliance monitoring, anomaly detection, and improving the efficiency of supervisory processes (Broeders et al., 2021; IMF, 2021). Studies specifically addressing the use of SupTech to support risk concentration analysis based on connected counterparties are relatively limited (BIS, 2024). Furthermore, most studies view SupTech as a technological instrument to improve supervisory operational efficiency, while studies linking SupTech to the transformation of organizational knowledge from tacit to explicit are rare (Aldasoro et al., 2022). Yet, in the practice of financial services sector supervision, supervisors' analytical capabilities are a crucial knowledge asset and need to be documented for sustainable use by the organization.

Based on these conditions, this study proposes the use of Supervisory Technology to support risk concentration analysis at the Financial Services Authority (OJK) through the integration of data on fund receipts, fund disbursements, and the identification of interconnected debtor groups. The novelty of this research lies in the development of a supervisory model that not only functions to improve the quality of integrated risk concentration analysis but is also capable of transforming supervisors' tacit knowledge into explicit knowledge documented within the supervisory system. Thus, this research is expected to contribute to the development of literature on Supervisory Technology, knowledge management, and risk-based supervision, while also providing practical recommendations for the OJK in improving supervisory effectiveness and strengthening the stability of the financial services sector in Indonesia.

## **2. RESEARCH METHOD**

The research used is a qualitative research type that involves the use and collection of various materials derived from potential data collection activities, namely through interviews, observations, and collecting necessary data from documents. In the clarification stage, the technique used in collecting information and data is by conducting in-depth interviews with respondents. The instruments intended to obtain qualitative data include problems and mapping user needs. The interviews will use an interview guide instrument, which is an open-ended question to informants, so that they can be answered more comprehensively by the informants. The results of the interviews that have been conducted will then be summarized and concluded by the researcher.

Based on how they are conducted, interviews are divided into two types: structured (formal or guided) and unstructured (informal or face-to-face). This allows for more accurate data and more definitive analysis than when questions are asked openly. Qualitative interviews tend to be the dominant method of interviewing in qualitative research, but this type of interview differs from structured interviews.

- The relationship between researcher and participant is not well-defined, with no questionnaire containing a comprehensive list of questions to be asked of participants. Researchers have a psychological framework within which to study the questions, but the specific questions asked by a particular participant will vary depending on the context of the interview.
- Qualitative researchers don't try to impose uniform behaviors or attitudes on every interview. On the other hand, qualitative interviews are conversations, and the interview itself will lead to a kind of social interaction, with a quality personal connection for each participant.
- Larger questions in qualitative interviews will be more open-ended than closed-ended questions, with participants limiting their responses to one-word responses, which would be the researcher's last resort. On the other hand, researchers try to get participants to use their own words.

## **2.1 Research Participants**

In keeping with the research objective of providing solutions to improve the supervisory business processes at the Financial Services Authority (OJK), the participants were supervisors who oversee financial services institutions in the financial services sector. Respondents included bank supervisors, financing institution supervisors, and supervisors of other financial services institutions. This study aimed to obtain an overview of the problems faced in each sector and formulate needed solutions (ideate stage).

## **2.2 Research Instruments**

As described in the Research Approach section, the author will use research instruments in the form of interviews and observations.

## **2.3 Solution Formulation**

In preparing solutions at the Ideate stage, the author built a mock-up/prototype, proposed system development according to the stages at the OJK, and evaluated the system's suitability (implementation stage) to the supervisor's needs in improving supervisory business processes. This research was conducted based on the author's knowledge of supervisory business processes, regulations, and information systems at the OJK, as well as discussions with several parties. It was also based on literature studies and management theory. The results of this research will serve as recommendations for improving work processes in the supervisory work unit at the OJK.

## **3. RESULTS AND DISCUSSION**

In accordance with the mandate of the PPSK Law to implement an integrated regulatory and supervisory system for all activities in the financial services sector, the Financial Services Authority (OJK) places a high level of attention on risk concentration in financial services institutions (LJK) and financial institutions (KK). Although the OJK has received detailed reports on each customer's risk exposure, the current supervisory

information system is unable to provide comprehensive risk concentration information on fund receipts and disbursements. Furthermore, financial services supervisors, spread across various work units, conduct analyses individually and manually, resulting in inconsistent processes and inconsistent, ineffective, and inefficient results.

The OJK has at least 23 work units that require risk concentration analysis, most of which oversee financial services institutions (FSI), financial service providers (EPP), and/or financial institutions (KK). These work units are spread across various sectors, including:

#### **Banking Sector**

- a. Department of Government Bank Supervision (DPBP),
- b. Department of Private Bank Supervision 1 (DPW1),
- c. Department of Private Bank Supervision 2 (DPW2),
- d. Department of Islamic Banking (DPBS), and
- e. Department of Special Inspection and Regional Banking Supervision (DRPD).

#### **Capital Market Sector**

- a. Department of Securities Institution Supervision (DPLE),
- b. Department of Regional Investment Management and Capital Market Supervision (DPVK),
- c. Department of Supervision of Issuers and Public Companies (DPEP), and
- d. Department of Special Inspection, Supervision of Derivatives, Carbon Exchange, and Securities Transactions (DRKT).

#### **Financing, Venture Capital, Microfinance, and Other Financial Services Institutions**

- a. Department of Supervision of Financing Institutions, PMV, and LKK (DPVL),
- b. Department of Supervision of LKM and Other Financial Services Institutions (DPLI),

#### **Insurance and Guarantee Sector**

- a. Department of Insurance Supervision and Supporting Services (DAJP),
- b. Department of Guarantee Supervision, Pension Funds and Special Supervision (DPDK), and
- c. Department of Licensing, Special Inspections, and Quality Control of PPDP (DIPD),

#### **Strategic Policy and Financial Conglomerate Supervision Sector**

- a. Department of Financial Conglomeration Supervision (DPKG),
- b. Department of Surveillance and Integrated Financial Services Sector Policy (DSKT),
- c. OJK Class A Office (Coordinator)
- d. OJK Office for Jabodebek and Banten Province;
- e. West Java Province OJK Office;
- f. OJK Office of Central Java Province;
- g. OJK Office of East Java Province;
- h. OJK Office of North Sumatra Province;
- i. OJK Office of South Sulawesi and West Sulawesi Provinces;
- j. OJK Office of South Sumatra and Bangka Belitung Provinces;
- k. Bali Province OJK Office; and
- l. OJK Office for East Kalimantan and North Kalimantan Provinces.

Beyond the aforementioned work units, dozens of other units also require risk concentration analysis, such as provincial OJK offices that do not coordinate or manage information for financial services institutions (FSI). Another problem in this work process is that the knowledge and experience gained by one supervisor cannot be transferred to other supervisors. This is because the work processes carried out by each supervisor and the lessons learned are not properly documented. Based on this situation, a work process is needed that can process data on the receipt and distribution of funds from financial services institutions (FSI), EPP, and KK (Finance Savings). This work process is carried out uniformly by all relevant work units within the OJK using the same set of data, resulting in the same information and conclusions.

In practice, to analyze the concentration of risk associated with receiving funds from and distributing funds to specific customer groups, the Financial Services Authority (OJK) needs to identify customers within a specific business group. Currently, comprehensive and up-to-date information on business groups is not available. Furthermore, it is important to determine which version of the business group definition to use, as various definitions exist, depending on the criteria used. Some define groups based on related parties (LJK) and non-related parties (LJK), based on ownership/control relationships (banking business groups or financial conglomerates), and still others based on ownership-management-finance relationships (debtor groups in the LLL calculation).

Considering that the objective of the analysis is to measure the concentration of risk in financial services institutions (FSI) for specific customer groups, the author believes, based on discussions with various parties, that customer groups should be determined using the criteria set out in the Minimum Credit Limit (BMPK) regulations. Furthermore, the Financial Services Authority (OJK) must compile a complete, accurate, and up-to-date list of "borrower groups" and all their members, based on information from various sources. This list will be used to determine the amount of funds received by a particular customer group to the FSI and the distribution of funds to that group from the FSI. Furthermore, the OJK also needs to measure the concentration of risk faced by financial services institutions (KK), which are business groups comprised of several FSIs, and the financial services sector as a whole. Furthermore, given the significant value, the OJK can also assess the impact of problems with specific customer groups on financial system stability.

### **3.1 Conditions to be achieved**

The Financial Services Authority (OJK) needs to identify the debtor groups with the largest loans, conduct a risk concentration assessment, and measure the impact on financial services institutions (FSI) if problems arise within these debtor groups. Furthermore, the OJK needs to assess the impact on the Financial Services Authority (KK) and the FSS as a whole. Furthermore, given the significant value, the OJK can also assess the impact of problems in specific debtor groups on financial system stability. This analysis should be conducted periodically and within a reasonable timeframe to allow the OJK to respond promptly to any conditions requiring attention and/or action.

Currently, the analysis process is performed manually by supervisors in various work units and different areas. This leads to inefficiencies in terms of the number of supervisors

involved, lengthy processing times, and the risk of human error. The implementation of Suptech is expected to provide various benefits for regulators and the financial services industry, including:

- a. Supervision Efficiency; Reduces reliance on time-consuming and error-prone manual processes.
- b. Early Detection of Financial Risks: Suptech can help supervisors identify signs of liquidity crises, bad debts, or asset bubbles early on before larger problems arise. This allows supervisory authorities to take swifter action to maintain financial system stability.
- c. Improving Compliance: If supervisors detect violations by financial services institutions (FSI) or financial institutions (KK), they can take action, including issuing warnings and/or sanctions for the violations. This ensures that financial services institutions (FSI) and financial institutions (KK) comply with applicable regulations.
- d. Operational Cost Savings: Suptech can reduce the need for human resources for processing, analyzing, and verifying reports. Regulators can allocate resources for strategic analysis and policy development.

Behind the benefits and opportunities offered, Suptech also has challenges and risks, and its implementation may face several obstacles, including:

- a. Data Security Issues: The use of a centralized system that is open to multiple parties, in this case supervisors from various departments within the Financial Services Authority (OJK), can increase the risk of sensitive information being leaked to unauthorized parties.
- b. Digital Infrastructure Limitations: Not all regulators or supervisors have adequate IT capacity. In developing countries, the main obstacles generally faced are limited bandwidth and supporting technical expertise.
- c. Resistance from supervisors and industry: Some financial services institutions (LJK) or financial institutions (KK) may be reluctant to share data due to concerns about competition or regulatory burden. Supervisors may also experience reluctance to use new application systems.
- d. Immature Regulations; One of the biggest problems with this program is the gap in regulations between sectors and the lack of specific definitions of business groups.

This research produces a systematic operational model or work process to compile a Business Requirement Definition (BRD) for the Enterprise Data Warehouse (EDW) application system regarding the addition of menus or data analysis functions for reports on receipts and distribution of funds from/to groups of LJK, KK, and FSS customers on a regular basis. LJK supervisors and KK supervisors can extract data from the EDW application, then analyze and assess concentration risks and their impact on LJK, KK, FSS, and FSK, as well as identify strategic issues of large debtors, report them to the OJK Leadership, and take necessary supervisory actions to the relevant LJK and KK. Furthermore, the related work units (DIMB, GPSI, DPSI, and GDST) develop the EDW application to add menus/functions based on the proposed new work processes, BRD, and FSD.

The data sources for EDW processing are LJK and EPP reports in the Banking, Non-Bank Financial Institutions (IKNB) and Capital Market sectors, including:

- a. Large amount banking funding reports available in the APOLO application system.
- b. Debtor data available in the SLIK application system.
- c. Report on the results of the public offering of debt securities.
- d. Third party fund reports (savings-current accounts-deposits) available in the ANTASENA application system.

In addition, to deepen the analysis, supervisors can use several reports as follows:

- a. The results of the examination of debtor sampling carried out by bank supervisors, PP supervisors.
- b. Data on relationships between debtor entities contained in EPP annual reports, financial reports, debtor information, and other sources.
- c. Report on the use of funds from the public offering.

### 3.2 The results obtained

Debtor loan exposure constitutes the largest portion of assets in banks, finance companies, and the financial services sector as a whole. Debtors within a business group (conglomerate) have a significant total loan exposure and can impact the condition of financial services institutions (FSI), financial institutions (KK), the financial services sector (SJK), and the financial services sector (SSK), either partially or completely. Therefore, the Financial Services Authority (OJK) needs to have accurate data on the loan exposure of debtor groups across all financial services institutions (FSI) and periodically analyze the impact on financial services institutions (FSI), financial institutions (KK), the financial services sector, and the financial services sector (SSK) if problems arise for specific debtor groups.

In response to this situation, the Financial Services Authority (FSI) supervisor initiated the addition of a function/menu to the EDW application system that allows for periodic processing of data on funding provided to debtor groups. Furthermore, the Financial Services Authority (FSI) supervisor and the Financial Services Authority (FSI) supervisor use the processed data from the EDW application to analyze concentration risk and its impact on the FSI, FSI, FSI, and FSI. They also identify strategic issues related to large debtors, report these to the Financial Services Authority (OJK) leadership, and take supervisory action against the FSI.

To achieve this, the KK supervisor added functions/menus to the EDW application. The KK supervisory work unit coordinated the initiative, working with several related work units, including the banking supervisory work unit (DPBP, DPW1, DPW2, DPBS), the financing company supervisory work unit, the capital market supervisory work unit, the information management work unit (DIMB), the IT management work unit (DPSI and GPSI), the integrated data management work unit (GDST), and other related work units.

The development of the EDW application for the fund distribution and receipt analysis module is expected to transform tacit knowledge into explicit knowledge, making it easier to understand and put into practice by others. According to the SECI Model, externalization of knowledge involves converting tacit knowledge into explicit knowledge. Tacit knowledge, previously held solely by supervisors, becomes explicit knowledge embedded

in the OJK application system and various supporting documents. Thus, supervisors' tacit knowledge can be transferred to future supervisors because it has been codified and documented properly and completely.

Referring to the design thinking stages as described in the Research Methods chapter, the following are the results of the analysis of each stage of design thinking.

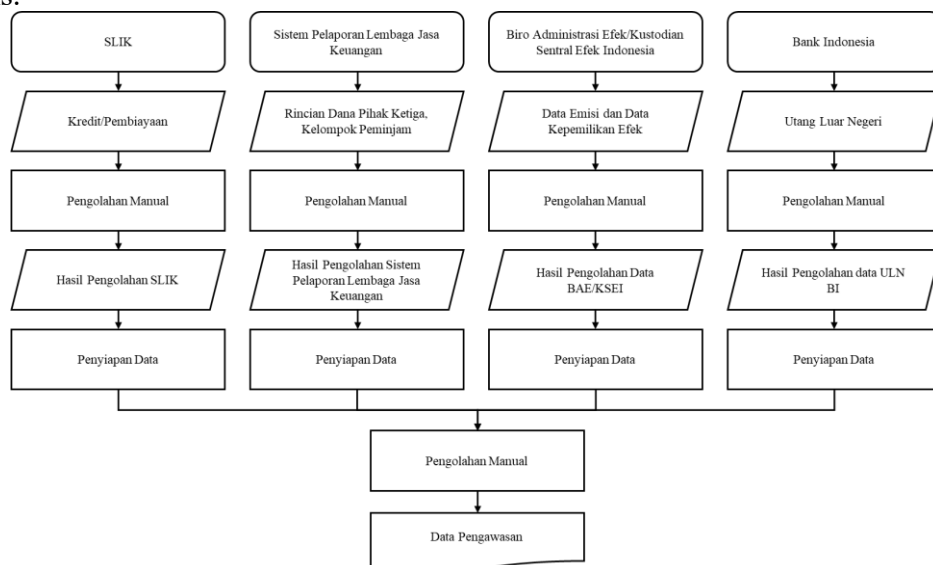
**a. Clarify**

Interviews and observations were conducted during the research period with the results that:

- 1) There is a need for a system that can automate the credit risk analysis work process, especially in mapping large exposures, considering that the current manual process has an impact on inefficiencies in both work time and work processes.
- 2) Of the 2 (two) criteria for mapping connected counterparty(ies) as per the international standard in identifying large exposures, currently the OJK has only carried out manual identification with the identification of new connected counterparty(ies) using a control approach.
- 3) The development of this system is expected to change tacit knowledge into explicit knowledge, so that it can be understood more easily and practiced by others.

**b. Ideate**

A system is needed to automate the credit risk analysis process and identify the concentration of funds disbursed and received, not limited to credit facilities and third-party funds (DPK), but also to debt instruments, bonds, stocks, and other instruments. Furthermore, the system is expected to identify financial services institutions (FSI) or financial institutions (KK) affected by problems affecting specific customers, customer groups, or industry sectors. Furthermore, the system must be accessible and processed uniformly by all relevant work units within the Financial Services Authority (OJK), ensuring users have the same set of data and generate the same information and conclusions.

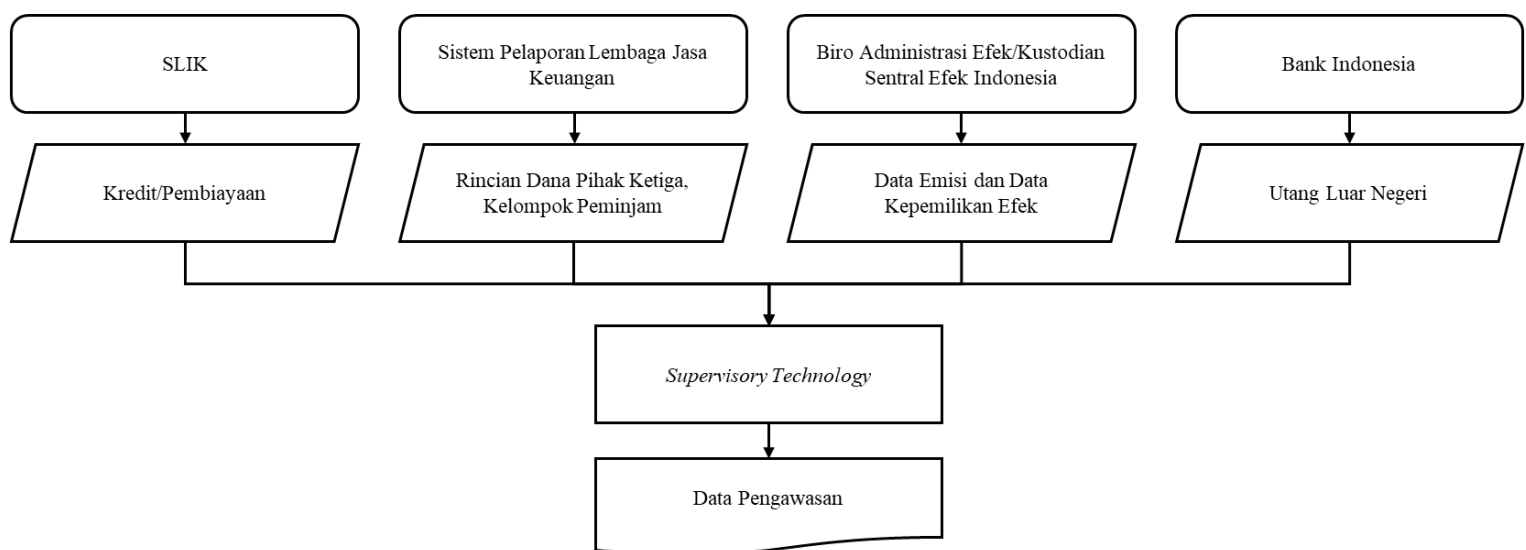


**Figure 2.** Current Business Process for Preparing Surveillance Data for Analysis

Currently, the analysis process is performed manually by supervisors in various work units and different areas. This leads to inefficiencies in terms of the number of supervisors involved, lengthy processing times, and the risk of human error. The implementation of Suptech is expected to provide various benefits for supervisory authorities and the financial services industry, including:

- 1) Supervision Efficiency; Reduces reliance on time-consuming and error-prone manual processes.
- 2) Early Detection of Financial Risks: Suptech can help supervisors identify signs of liquidity crises, bad debts, or asset bubbles early on before larger problems arise. This allows supervisory authorities to take swifter action to maintain financial system stability.
- 3) Improving Compliance: If supervisors detect violations by financial services institutions (FSI) or financial institutions (KK), they can take action, including issuing warnings and/or sanctions for the violations. This ensures that financial services institutions (FSI) and financial institutions (KK) comply with applicable regulations.
- 4) Operational Cost Savings: Suptech can reduce the need for human resources for processing, analyzing, and verifying reports. Regulators can allocate resources for strategic analysis and policy development.

To realize the above expectations, it is necessary to develop an application system that can help supervisors identify debtor groups and analyze credit risk concentrations on debtors or debtor groups with large loan exposures. The KK supervisory work unit is coordinating this initiative in collaboration with several supervisory work units in the banking, finance companies, capital markets, and insurance and pension fund sectors. In addition, the system development process will also involve several other work units, such as the information management work unit (DIMB), IT management work units (DPSI and GPSI), and the integrated data management work unit (GDST). The following are the solutions planned to be developed in this research.



**Figure 3.** New Business Process for Preparing Monitoring Data for Analysis

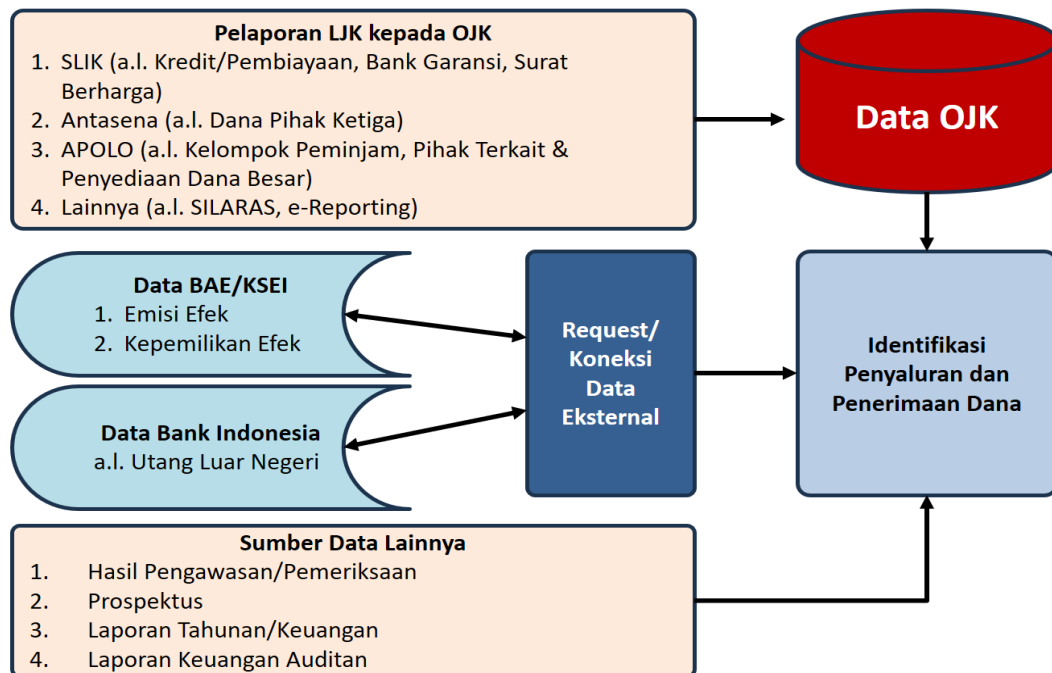
**c. Develop**

The Financial Services Authority (OJK) has developed an Integrated Financial Services Authority (FSA) EDW (Educational Data System) that serves as a means to integrate data from various sources to produce high-quality, metadata-driven data. High-quality, integrated data is essential to support the OJK's oversight of the financial services industry and to facilitate more precise and accurate decision-making through information technology. The Integrated FSA EDW has been underway since 2020, encompassing supervisory modules for banking, capital markets, financing and venture capital, insurance and pension funds, consumer education and protection, and cross-sectoral EDWs.

The risk analysis function is included in the cross-sector EDW module, with several key features including the Customer Profiling menu and the Fixed Report menu. The Customer Profiling menu is a feature that searches for individual/business entity facility data based on the National Identification Number (NIK)/Taxpayer Identification Number (NPWP) to obtain financial information owned by the individual or business entity sourced from SLIK and LBUT data. The Fixed Report menu is designed to allow supervisors to quickly obtain information on risk concentrations in specific LJK or KK. The fixed reports provided include:

- 1) 100 largest debtors per LJK summary
- 2) 100 largest debtors per LJK per quality type
- 3) 100 largest debtors among financial conglomerates
- 4) 100 debtors financed by > 1 LJK in a financial conglomerate
- 5) 100 largest debtors based on the number of LJK creditors
- 6) 100 largest DPK owners in all banks
- 7) 100 largest DPK owners across all banks per financial conglomerate
- 8) 100 largest DPK owners per product type
- 9) The 100 largest debtors have different qualities between LJKs
- 10) The 100 largest debtors differ in quality between LJKs per financial conglomerate

The description of the relationship between the systems that will be related to improving the work process in this research is as follows:



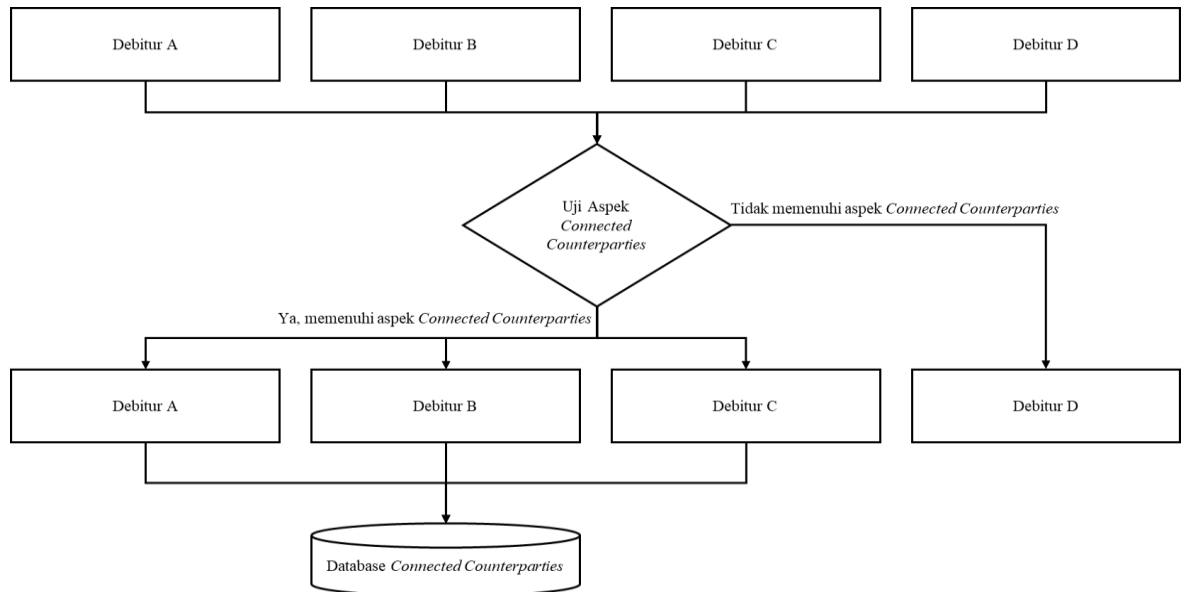
**Figure 4.** Relationship between Systems and Data in LJK Risk Concentration Analysis 9

#### d. Implement

The EDW-DSA development, which has been ongoing for the past two years, has been able to produce fixed report output, as was the goal of Suptech's development. Granular-based data processing can produce more reliable output than the manual processing currently used. During the testing period, findings regarding the use of the system's results/output included:

- 1) Using a Taxpayer Identification Number (NPWP) as a unique identifier presents challenges, given that some businesses have more than one NPWP. Furthermore, the accuracy of the reporting entity's NPWP (in this case, the reporting financial services institution) still needs to be tested.
- 2) *Single Digit Investor* The SID, which serves as a unique identifier for processing emissions and securities ownership data, still needs to be tested for SID duplication. Furthermore, a system is needed that can integrate the NPWP with the SID, resulting in a single unique identifier that can integrate SLIK and BAE/KSEI data collection.
- 3) A Connected/Group Identifier (CGI) is required, which is a mandatory field in all reporting systems that serve as input to the system. CGI can be an additional field in reporting or a combination of several unique identifiers within suptech.

Furthermore, based on test results and feedback on suptech development, particularly in identifying concentration risk and contagion risk, mapping the interconnectedness between parties is required, as per the BCBS standard for testing connected counterparties. As an illustration, the following are the testing stages.



**Figure 5.** Debtor Connectedness Testing Stages and Connected Counterparties Database Processing

**4. CONCLUSION**

This research demonstrates that risk concentration analysis is a crucial component of financial services sector supervision, designed to detect potential risks that could disrupt financial system stability. Currently, the analysis process is still performed manually, making it inefficient, inconsistent, and highly dependent on the experience of each supervisor. This research proposes the use of Supervisory Technology (SupTech) to integrate analysis of fund receipts, fund disbursements, and debtor group connectivity in a more systematic and standardized manner. The implementation of SupTech not only increases the effectiveness of risk-based supervision but also enables the transformation of supervisors' tacit knowledge into documented explicit knowledge that can be utilized sustainably. SupTech has the potential to strengthen the quality of supervision, increase analytical consistency, and support more effective decision-making in maintaining financial services sector stability.

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